



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/735,732	12/16/2003	Atsushi Tokuda	740756-2684	3635
22204	7590	12/14/2007	EXAMINER	
NIXON PEABODY, LLP 401 9TH STREET, NW SUITE 900 WASHINGTON, DC 20004-2128			GARRETT, DAWN L	
			ART UNIT	PAPER NUMBER
			1794	
			MAIL DATE	DELIVERY MODE
			12/14/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	Application No.	Applicant(s)
	10/735,732	TOKUDA ET AL.
	Examiner Dawn Garrett	Art Unit 1794

— The MAILING DATE of this communication appears on the cover sheet with the correspondence address —  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 17 September 2007.
- 2a) This action is **FINAL**.                            2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-5,7-15 and 20-37 is/are pending in the application.
  - 4a) Of the above claim(s) 21-37 is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-5,7-15 and 20 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 27 July 2004 is/are: a) accepted or b) objected to by the Examiner.
 

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    - Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    - Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	5) <input type="checkbox"/> Notice of Informal Patent Application
3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____	6) <input type="checkbox"/> Other: _____

**DETAILED ACTION**

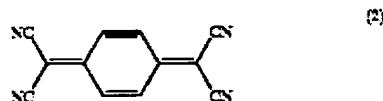
***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on September 17, 2007 has been entered.

2. Claim 1 was amended. Claims 6 and 16-19 are canceled. Claims 20-37 have been added. Claims 1-5, 7-15, and 20-37 are pending.

3. The species under consideration remain as the following:

Polythiophene as the conjugate polymer and Formula (2) as the electron-accepting compound.



Claims 1-5, 7-15 and 20 read upon the elected species and are currently under consideration. Claims 21-37 are withdrawn as non-elected as they are not drawn to a polythiophene conjugate polymer.

4. The rejection of claims 1-7 and 13-15 under 35 U.S.C. 103(a) as obvious over Heuer et al. (US 6,368,731) in view of Lidberg et al. Proceedings of SPIE - The International Society for Optical Engineering (1995), 2397 (Optoelectronic Integrated Circuit Materials, Physics, and Devices), p. 633-42 is withdrawn due to the amendment.

5. The rejection of claims 8-11 under 35 U.S.C. 103(a) as obvious over Heuer et al. (US 6,368,731) in view of Lidberg et al. Proceedings of SPIE - The International Society for Optical Engineering (1995), 2397 (Optoelectronic Integrated Circuit Materials, Physics, and Devices), p. 633-42 in further view of Yang et al. (US 5,723,873) is withdrawn due to the amendment.

6. The rejection of claim 12 under 35 U.S.C. 103(a) as obvious over Heuer et al. (US 6,368,731) in view of Lidberg et al. Proceedings of SPIE - The International Society for Optical Engineering (1995), 2397 (Optoelectronic Integrated Circuit Materials, Physics, and Devices), p. 633-42 in further view of Ara (US 6,613,454) is withdrawn due to the amendment.

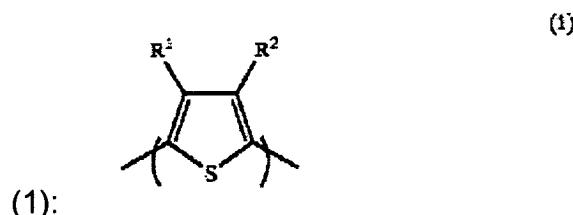
***Claim Rejections - 35 USC § 112***

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 1-5, 7-15 and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 sets forth "wherein the conjugate polymer is expressed by the formula



Since the formula shown appears to be a repeating unit rather than a polymer, it is unclear if the polymer comprises multiple units of formula (1) and if the polymer is solely comprised of formula (1). The polymer has not been clearly described. Clarification and/or correction are required. For the purpose of consideration in terms of prior art, the polymer of claim 1 has been interpreted as requiring at least one thiophene ring as shown by formula (1).

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 1-5, 7 and 13-15 are rejected under 35 U.S.C. 103(a) as obvious over Heuer et al. (US 6,368,731) in view of Andersson et al. (WO 94/02530) in view of Lidberg et al. Proceedings of SPIE - The International Society for Optical Engineering (1995), 2397 (Optoelectronic Integrated Circuit Materials, Physics, and Devices), p. 633-42. Heuer et al. teaches electroluminescent assemblies comprising a substrate, an anode, an electroluminescent element and a cathode (see abstract). The electroluminescent element contains one or more zones selected from the group consisting of hole injection zone, hole transport zone, electroluminescent zone, electron transport zone, and electron injection zone (see abstract). Heuer et al. teaches the hole injection zone is preferably comprised of an uncharged or cationic polythiophene (see col. 2, lines 32-56). Heuer et al. is silent with respect to teaching polythiophenes

comprising a unit as set forth in instant formula (1). Andersson et al. teaches forming polythiophenes with improved thermal stability by substituting the polythiophene rings (see abstract and entire document). Specifically, Andersson et al. teaches a unit according to formula (II) wherein R1 and R2 may be substituents such as alkylaryl and alkylthioalkyl (see page 3, formula II and page 4, lines 20-32). It would have been obvious to one of ordinary skill in the art to have selected a polythiophene taught by Andersson et al. to be used in a device according Heuer et al., because one would expect the Andersson et al. polythiophenes to provide the benefit of increased thermal stability, which is important in a device that generates heat upon using.

Heuer et al. is also silent with respect to including an electron acceptor in the device. Lidberg et al. teaches polythiophenes doped with electron acceptors such as 7,7,8,8-tetracyanoquinodimethane (TCNQ) as oxidized conductive polymers (see abstract, Figure 1, and page 635, first line of first paragraph under 2.1 heading). The oxidized polymers are taught to be applicable to applications such as light emitting diodes (see page 633, second and third lines of text under "Introduction" heading). Lidberg et al. further teaches doping a polythiophene with the dopants such as TCNQ provides the benefit of increased charge-carrier mobility and increased electrical conductivity (see paragraph under "Fig. 2" on page 635). It would have been obvious to one of ordinary skill in the art to have included an electron acceptor taught by Lidberg et al. in a device according to Heuer et al., because Lidberg teaches the dopant provides increased conductivity compared to undoped polythiophene. Claims 13 and 14 are

considered to be product-by-process type claims and Heuer et al. is deemed to disclose the final product as required (see MPEP 2113).

11. Claims 8-11 are rejected under 35 U.S.C. 103(a) as obvious over Heuer et al. (US 6,368,731) in view of Andersson et al. (WO 94/02530) in further view of Lidberg et al. Proceedings of SPIE - The International Society for Optical Engineering (1995), 2397 (Optoelectronic Integrated Circuit Materials, Physics, and Devices), p. 633-42 and in further view of Yang et al. (US 5,723,873). Heuer et al., Andersson et al., and Lidberg are relied upon as set forth above. Heuer et al. teaches the zone or zones located between the hole injection zone and the cathode can also assume a plurality of functions, i.e. one zone can contain, for example, hole-injecting, hole-transporting, electroluminescent, electron-transporting and/or electron injecting substances (see col. 2, lines 63-67). Yang et al. teaches in analogous art "electron injection layer" and "hole blocking layer" are synonymous terms used in the art (see col. 16, line 2). It would have been obvious to one of ordinary skill in the art at the time of the invention to have included an electron injection zone (hole blocking layer) in the Heuer et al. device, because Heuer et al. teaches such a functional zone may be included in the device.

12. Claim 12 is rejected under 35 U.S.C. 103(a) as obvious over Heuer et al. (US 6,368,731) in view of Andersson et al. (WO 94/02530) in further view of Lidberg et al. Proceedings of SPIE - The International Society for Optical Engineering (1995), 2397 (Optoelectronic Integrated Circuit Materials, Physics, and Devices), p. 633-42 and in further view of Ara (US 6,613,454). Heuer et al., Andersson et al., and Lidberg are relied upon as set forth above. Heuer et al. teaches inclusion of a light emitting material

in the electroluminescent layer (see col. 21, lines 16-19 and col. 21, lines 47-53), but fails to disclose specifically a triplet-excitation type light emitting material. Ara teaches in analogous art the use of light emitting layers for electroluminescent devices exhibiting triplet-excitation (see col. 7, lines 38-45). It would have been obvious to one of ordinary skill in the art at the time of the invention to have selected a light emitting layer exhibiting triplet excitation as taught by Ara for the light emitting layer (electroluminescent layer) of the Heuer et al. device, because Ara teaches such a layer is known in the art and one would expect the light emitting layer material to be similarly useful as light emitting material in the Heuer et al. device.

***Allowable Subject Matter***

13. Claim 20 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art fails to teach an aromatic group comprising the specific further substitution groups as set forth in claim 20 for R1 and R2.

***Response to Arguments***

14. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dawn Garrett whose telephone number is (571) 272-1523. The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Milton Cano can be reached on (571) 272-1398. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Dawn Garrett/

Dawn Garrett  
Primary Examiner  
Art Unit 1794

December 7, 2007